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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/853,289	05/09/2001	Myung-Lae Lee	51876p244	6039

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EXAMINER

KIM, RICHARD H

ART UNIT PAPER NUMBER

2882

DATE MAILED: 10/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/853,289

Applicant(s)

LEE ET AL.

Examiner

Richard H Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scobey (US 5,789,915), in view of Tayebati (US 6,324,192 B1) and Durand et al. (US 4,377,324).

Referring to claim 1, Scobey discloses an optical filter comprising a fixed mirror including a number of first erecting plates; a mirror including a number of second erecting plates; and a gap disposed between both mirrors (see Fig. 6). However, the reference does not disclose a movable mirror including a number of second erecting plates; an air gap disposed between the fixed mirror and the movable mirror; and an actuator reciprocating the movable mirror for changing the width of the air gap, wherein the actuator utilizes an electrostatic force as driving force and lever mechanism for accurating displacement and improving a tolerance of the air gap between the fixed mirror and the movable mirror.

Tayebati discloses a movable mirror including a number of second erecting plates (see Fig. 1b); an air gap disposed between the fixed mirror and movable mirror (see Fig. 1b); and electrostatically reciprocating the movable mirror for changing the width of the air gap (see col. 1, lines 49-57), and lever mechanism (see Fig. 1b). Durand et al. further discloses a tunable filter comprising an actuator mechanism (see Fig. 1, ref. 17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a movable mirror including a number of second erecting plates; an air gap disposed between the fixed mirror and the movable mirror; and an actuator reciprocating the movable mirror for changing the width of the air gap, wherein the actuator utilizes an electrostatic force as driving force and lever mechanism for accurating displacement and improving a tolerance of the air gap between the fixed mirror and the movable mirror since Durand et al. states in column 2, lines 41-43, that such a modification would enable a percentage of light transmitted through the filter to be adjust with the air gap, thereby adding versatility to the device. Further, the use of an electrostatic actuator and lever mechanism would improve the precision of the displacement of the device by providing a controlled movement of the mirror relative to the other mirror. By applying an electromagnetic field to the plates, one is able to adjustably control the movement of the mirror due to the amount of electromagnetic force applied to the mirrors. Further having a lever device would provide a more stable consistent movement of the mirror along the axis of displacement.

Referring to claim 3, Scobey, Durand et al. and Tayebati disclose the device previously recited. Scobey does not disclose that the movable mirror further includes an oxide layer formed below the second erecting plates and functioning as a sacrificial layer.

Tayebati discloses a sacrificial layer formed below the second erecting plates (see col. 6, lines 19-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have an oxide layer formed below the second erecting plates and functioning as a sacrificial layer in order to improve the ease of fabrication of the device.

According to Tayebati, "by selectively removing the sacrificial layer, the top mirror can be machined into a cantilever of a platform. In this case, the cantilever or platform contains the top distributed Bragg reflector, whereas the substrate contains the bottom DBR of the Fabry-Perot structure. The two mirror are now separated by an air gap, and this gap can be changed by applying an electric field to the top and bottom electrodes of the device which makes it possible to tune the resonant frequencies of the device" (see col. 6, lines 23-31). Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice *In re Leshin*, 125 USPQ 416.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scobey, Tayebati and Durand et al. further in view of Kubota et al. (U.S. 4,751,509) and Scott (U.S. 6,160,834)

Scobey and Durand et al. disclose the optical tunable filter previously recited. However, the references do not disclose the optical tunable filter wherein each of the erecting plates are made of silicon and has a thickness determined but the equation, $(2m+1)\lambda/4n$, and the air gap has a width determined by an equation of $(2m+1)\lambda/4$.

Scott discloses erecting plates made of silicon (see col. 11, lines 15-20). Further, Kubota et al. disclose a thickness determined by the equation $(2m+1)\lambda/4n$ (see col. 4, line 51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Scobey and Durand et al. such that the tunable filter includes erecting plates made of silicon since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice *In re Leshin*, 125 USPQ 416, and further for silicon's

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insulating properties, thereby preventing overheating of the device from the mirror. Moreover, it would have been obvious to one having ordinary skill in the art at the time was made to modify the teachings of Scobey and Durand et al. in order for the tunable filter comprise of erecting plates with a thickness determined by the equation $(2m+1)\lambda/4n$, since such an equation is known in the art to determine the thickness of a structure, given the wavelength and the refractive index of a material. It is noted by the examiner that the refractive index of air is known to be approximately one, yielding the equation $(2m+1)\lambda/4$ for the width of the air gap. Further, it would have been obvious to one having ordinary skill in the art at the time the invention was made to manipulate an already known formula in order to produce a desired result given known parameters of a device.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scobey, Tayebati and Durand et al., further in view of Tam (U.S. 5,990,769).

Scobey and Durand et al. disclose the tunable optical filter previously recited. However, the references do not disclose that the actuator includes a fixed electrode and a moveable electrode, the fixed electrode being mechanically connected to the moveable electrode with an elastic member intervening therebetween and the moveable electrode being mechanically coupled with the moveable mirror.

Tayebati discloses to electrodes mechanically connected by an elastic member intervening therebetween (see col. 6, lines 19-31). Tam discloses an actuator including an electrode mechanically connected by an elastic member to a moveable electrode (see col. 1, lines 51-64).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teaching to Scobey, Durand et al. and Tayebati to include an actuator which includes a fixed electrode and a moveable electrode, the fixed electrode being mechanically connected to the moveable electrode with an elastic member intervening therebetween and the moveable electrode being mechanically coupled with the moveable mirror, in order to induce a voltage difference between the electrode connection, while having controlled and restricted movement via the elastic connection, thereby inducing controlled and restricted movement of the moveable mirror.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scobey, Durand et al., and Tam, as applied to claim 4, further in view of Fujita et al. (U.S. 4,887,109).

Scobey, Durand et al. Tayebati and Tam disclose the apparatus previously recited. Tam further discloses a leaf spring disposed between two contacts (see col. 1, lines 52-55). Fujita et al. discloses a link lever disposed adjacent to a spring, and proximate to an actuating device (see col. 4, lines 59-63).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teaching of Scobey, Durand et al., and Tam to have the device include a silicon leaf spring as the elastic member and a link lever intervening between the leaf spring and the moveable electrode in order for the leaf spring to urge the two electrodes into a first position and a second position, as disclosed in col. 1, lines 52-64, which would cause the mirror to move, thereby adding controllability to the device. Further, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the

device include a silicon leaf spring as the elastic member and a link lever intervening between the leaf spring and the moveable electrode in order for the link lever to decrease the elasticity of the leaf spring, since the link lever is a strictly rigid and inelastic element, thereby adding a more controlled movement of the device. Moreover, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the leaf spring made of silicon, since it is known in the art that silicon is an effective insulator and would guard against excessive heat transfer from one electrode to the other.

6. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scobey in view of Durand et al.

Scobey discloses a communication device for demultiplexing/multiplexing various wavelengths, comprising an input optical fiber, a number of output optical fibers, and an array of optical filters, wherein the optical filter is regularly arranged to correspond to one input/output optical fiber (see Fig. 2-3, and col. 10, lines 35-44). Scobey further discloses an optical filter comprising a fixed mirror including a number of first erecting plates; a mirror including a number of second erecting plates; and a gap disposed between both mirrors (see Fig. 6). However, the reference does not disclose the mirror including a number of second erecting plates as being movable and an air gap disposed between the fixed mirror and the movable mirror, wherein an actuator reciprocating the movable mirror for changing the width of the air gap.

Durand et al. discloses two mirrors, and an air gap disposed there between, wherein the air gap's width is adjustable by an actuator (see Fig. 1 and col. 2, lines 23-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teaching of Scobey to include an air gap between both mirrors, wherein one mirror is fixed and the second mirror is adjustable by an actuator to change the width of the air gap, since Durand et al. states in column 2, lines 41-43, that such a modification would enable the percentage of light transmitted through the filter to be adjusted with the air gap, thereby adding versatility to the device.

Response to Arguments

4. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

5. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard H Kim whose telephone number is (703)305-4791. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703)305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Richard H Kim
Examiner
Art Unit 2882

RHK
October 3, 2002


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SUPERVISORY PATENT EXAMINER
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